Energy That Moves Life

Waste Management Procedure

APPROVALS

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1. PURPOSE

The purpose of this procedure is to establish and maintain a system by which all types of waste generated at K-Electric can be managed effectively. This procedure will assist in specifying safe and environmentally sound practices and establishing minimum requirements that must be followed for handling, storage, collection, transportation and disposal of both hazardous and non-hazardous wastes.

2. BACKGROUND

Waste is generated from various activities at different locations across KE. The type of waste generated depends upon the nature of operations and activities at a particular location or site. The categories include (but are not limited to), biodegradable and non-biodegradable, hazardous and non-hazardous, solid and effluents. It is the responsibility of the respective BU to protect human health and the environment by ensuring compliance with the applicable regulatory requirements.

3. SCOPE

This procedure applies to the employees and third-party contractors/suppliers working within KE's jurisdiction, where waste in any form is generated, collected, segregated, transferred from, transported to, handled, temporarily stored or disposed of.

4. DISTRIBUTION

All employees and contractor staff - KE

5. REQUIREMENT

Following rules and other regulatory requirements are considered in developing the procedure:

a) Corporate HSEQ Policy
b) Pakistan Environmental Protection Act 1997
c) Sindh Environmental Protection Act 2014
d) Pakistan Hazardous Substance Rule 2003
e) Sindh Hazardous Substances Rules 2014
f) IFC General EHS Guidelines: Environmental Waste Management
g) IFC EHS Guidelines for Electric Power Generation, Transmission and Distribution
h) IFC Performance Standard 3: Resource Efficiency and Pollution Prevention
i) Internationally accepted best practices

6. DEFINITIONS

Anaerobic Digestion: series of biological processes in which microorganisms break down biodegradable material in the absence of oxygen.

Clinical Waste: normally refers to waste produced from health care facilities including surgical items, swabs, pharmaceuticals, blood, body parts, wound dressing materials, needles and syringes.

Disposal: any operation which may lead to resource recovery, recycling, reclamation, direct re-use or alternative uses (Basel Convention).

Hazardous Waste: waste that has any of the following properties - ignitability, corrosivity, reactivity or toxicity. Also included in this category are Nuclear waste, Clinical waste, and Electronic waste.

Incineration: The controlled combustion of waste to reduce its volume or toxicity.

Organic Waste: any material that is biodegradable and comes from either a plant or an animal. such as food, garden and lawn clippings or timber.

Liquid Waste: in a facility may include grease trap waste and used lubricating oils. It also includes liquid waste generated from plant operation or process, other untreated effluent that is normally discarded in sewer.

Municipal Waste: is generated as a result of the ordinary daily activities. It generally comprises of garbage and rubbish (such as bottles, cans, clothing, compost, disposables, food packaging, food scraps, newspapers and magazines, and yard trimmings).

MSDS (Material Safety Data Sheet): formal document containing information about the characteristics and actual or potential hazards of a substance.

PPE: Personal Protective Equipment

Pyrolysis: A thermochemical decomposition of organic material at elevated temperatures in the absence of oxygen (or any halogen). It involves the simultaneous change of chemical composition and physical phase, and is irreversible.

Landfill: containing impervious barriers to prevent the migration of contaminants to the surrounding environment.

Waste: unwanted or unusable material that is to be discarded.

Waste Management: administration of activities that provide for the collection, segregation, storage, transportation, transfer, processing, treatment, reuse (recycle) and disposal of waste.

Waste Minimization: includes reducing waste before it is even generated and environmentally sound recycling.

7. RESPONSIBILITIES

Head of Corporate HSEQ

a) Shall ensure that the waste management procedure is prepared and disseminated across KE.
b) Shall ensure that the procedure is implemented through a system of audits.
c) Shall ensure that awareness and training programs are planned and executed for effective waste management and disposal.

BU Heads

a) Shall approve BU specific procedure in line with CHSEQ Waste Management Procedure and ensure its implementation.
b) Shall ensure appropriate allocation of resources to enable the implementation of Waste Management Procedure.
c) Shall approve budget for disposal of hazardous waste through SEPA certified waste contractors.
d) Shall ensure that relevant staff is trained in dealing with the waste material especially hazardous wastes.

HSE Coordinators

a) Shall ensure that BU specific customized procedure is prepared in line with CHSEQ Waste Management Procedure.
b) Shall ensure that relevant staff has attended training on waste management.
c) Shall be responsible for managing and disposing waste as specified in this procedure and in accordance with legislative requirements.
d) Shall ensure that inventory of waste (both hazardous and non-hazardous) disposal is maintained as per KE-SP-012-F02.

e) Shall ensure to segregate and label waste before disposal and keep tracking record.
f) Shall ensure that hazardous waste is safely disposed through EPA certified third party contractors.
g) Shall get waste record including disposal certificate from third party contractor in accordance with applicable legislation.
h) Shall ensure that record of waste (hazardous and non-hazardous) disposal is shared with CHSEQ on monthly basis.
i) Shall maintain complete record of waste disposed for minimum three years.

Contractor

a) Shall ensure compliance with the requirements of laws and KE procedures wherever applicable.
b) Shall develop site specific plan prior to performing waste handling, storage, transportation or disposal.
c) Shall refer to contractual agreements, waste management procedure and site-specific plan for guidance.
d) Shall ensure that waste is managed in consultation with the site/BU HSEQ Coordinator.
e) Maintain auditable records and share with the site/BU HSEQ Coordinator on monthly basis.

8. OVERVIEW – WASTE

Basel Convention defines Wastes as "substances or objects which are disposed of, are intended to be disposed of, or are required to be disposed of by the provisions of the law". Wastes can be broadly classified into non-hazardous, inert and hazardous waste streams.

8.1. NON-HAZARDOUS WASTE

a) **Organic and domestic waste**: such as food, garden and lawn clippings. It can also include animal and plant based material and degradable carbon such as paper, cardboard and timber. Disposal of such waste normally presents little difficulty and it can often be routed to municipal recycling or disposal facilities on a frequent basis.

b) **Scrap Material**: such as metal scrap, glass, or wood scraps and empty containers (except those previously used to contain hazardous materials which should, in principle be managed as a hazardous waste); and residual waste from industrial operations, such as boiler slag, clinker, and fly ash.

8.2. INERT WASTE

Inert waste is waste which is neither chemically or biologically reactive, and nor decomposes. Examples include sand and concrete. This can be reused by construction contractors in ongoing projects and has particular relevance to landfills as it typically requires lower disposal fees than biodegradable waste or hazardous waste.

8.3. HAZARDOUS WASTE

a) Hazardous waste shares the properties of a hazardous material (e.g. ignitability, corrosivity, reactivity or toxicity) or other physical, chemical, or biological characteristics that may pose a potential risk to human health or the environment if improperly managed. A complete procedure on Hazardous Substance Management (KE-SP-017) is available that provides the details on management of hazardous materials. When a hazardous material is no longer usable for its original purpose and is intended for disposal, but still has hazardous properties, it is considered as hazardous waste.

b) Waste may also be defined hazardous by local regulations or international conventions, based on the origin of waste and its inclusion on hazardous waste lists, or based on its characteristics.

c) Sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, and other discarded material, including solid, liquid, semi solid or contained gaseous material resulting from industrial operations need to be evaluated on a case by case basis to establish whether it constitutes a hazardous or a non-hazardous waste.

9. WASTE MANAGEMENT

Waste management is the process linked to waste minimization, generation, collection, segregation, transportation, recycling or processing, recovery and final disposal. Waste management also aids in entailing the safe and efficient manner of disposal of materials to avoid their adverse effect over human, health and environment. Useful resources can also be recovered from waste management methods. Facilities that generate waste should characterize their waste according to composition, source, types of wastes produced, generation rates, or according to local regulatory requirements.

9.1. WASTE HIERARCHY

The waste hierarchy ranks waste management options according to the best environmental outcome taking into consideration the lifecycle of the material. In its simplest form, the waste hierarchy gives top priority to preventing waste. When waste is created, it gives priority to preparing it for reuse, then recycling, then other recovery, and last of all disposal (i.e. landfill).

9.1.1. REFUSE

The top-level option is "prevention" or "avoidance". This waste is prevented in the most obvious way: by avoiding its production or purchase entirely. For example, plastic carrier bags can be prevented from going to a landfill by using long-life bags, such as canvas bags.

9.1.2. REDUCE

Reducing waste is self-explanatory and relies on making a process more efficient. This can be achieved through:

a) Material elimination
b) Inventory control and management
c) Material substitution
d) Conservation of natural resources
e) Process modification
f) Improved housekeeping
g) Purchase of materials in bulk
h) Use of reusable rather than disposable containers
i) Avoiding purchase of goods with excessive packaging
j) Avoiding wastage of materials
k) Better handling and storage practices to prevent damage

9.1.3. RE-USE

Wherever possible, items should be reused instead of discarding; examples include:

a) Reuse of containers such as bins and barrels of non-hazardous substances. (Empty containers that previously contained hazardous substance are counted as hazardous waste)
b) Recovery and reuse of refrigerants during maintenance.

c) Handle and store packaging material so that it can be reused either at site or by others if sold.
d) Materials that can be reused should be segregated from the waste stream, cleaned and repaired prior to storage for future reuse.

9.1.4. RECYCLE

Recycling is defined as putting energy into a waste item to convert it to something else entirely, sometimes with lower grade and value. It saves on processing or extracting of raw materials; hence it is useful when materials are limited, and reuse becomes difficult. The materials that can be recycled are:

a) Paper, cardboard, aluminum cans, wood, glass/plastic bottles
b) Scrap material such as metals, wood
c) Waste oil
d) Components of e-waste

9.1.5. RECOVER

Energy recovery from waste is the conversion of non-recyclable waste materials into usable heat, electricity, or fuel through a variety of processes, including combustion, gasification, pyrolysis, anaerobic digestion and landfill gas recovery. This process is termed as waste to energy.

9.1.6. DISPOSE

Waste disposal to landfill should only be considered when no option further up the hierarchy is possible. It is the least favored option because nothing can be taken back. Once something is in a secured landfill, there is no real harm the waste can do as it degrades naturally - although this can take thousands of years. However, environmental harm can be caused through release of greenhouse gases and toxins and their infiltration causing soil and underground water contamination if it is an open landfill.

9.2. WASTE INVENTORY

The waste inventory provides comprehensive and up-to-date information on all waste materials that can be generated at a site. The first step in building an inventory would be to survey the facility and list down all current and expected wastes. Expected wastes may include wastes from an irregular activity or a new project being carried out in near future. Separate sheets can be maintained for different types of materials. This can help in keeping the record forms updated with current site situation. The list can be categorized as follows:

a) Recurring Materials
b) Unused Materials
c) Unknown Material

9.2.1. RECURRING MATERIALS

Include wastes that are normally generated on a recurring basis, such as the following:

a) Office paper, cardboard, plastic, metal and glass;
b) Food wastes from cafeteria/ Food and beverage containers;
c) Used oil and chemicals;
d) Wastes associated with heating and air conditioning systems, and building maintenance;
e) Wastes produced from operations.

9.2.2. UNUSABLE MATERIALS

Include each unused chemical or other unused material that may not be needed anymore. This could be due to one of the following reasons:

a) Expired shelf life;
b) Off specification for the process it was intended for;

c) No longer needed due to process/site changes – resulting from a change in business products or material substitution.

9.2.3. UNKNOWN MATERIALS

Include anything that is unidentifiable or unknown present at the facility. Such type of materials could include unlabeled drums/containers or equipment. Precautions must be taken in case of unknown materials such as;

a) Open metal containers only with non-sparking tools, in case contents are flammable. Don't smell unknown chemicals and take precautions to prevent contact with eyes and skin.
b) If the container or equipment is in poor condition, or damaged in any way, make necessary arrangement before moving or touching the container e.g. old transformers may contain transformer oil and contamination of soil may occur due to its leakage.

9.3. MONITORING & REPORTING

All the waste generated shall be segregated, quantified and recorded prior to storage and disposal. A record should state storage location, time period and disposal method, the quantity disposed of and the name of end disposal contractor/source etc. as per template outlined in KE-SP-012-F02. The quantity shall be reported to CHSEQ on monthly basis.

9.4. WASTE SEGREGATION, PACKING AND LABELING

9.4.1. WASTE SEGREGATION

Wide range of wastes are generated by the activities undertaken across KE. These wastes require segregation at the generating sites according to its nature, so that mixing of various types can be avoided and effective safe disposal can be ensured. Waste generated at BU sites can be segregated into categories defined in KE-SP-012-F01.

9.4.2. WASTE COLLECTION

Colored containers to be placed at collection points with the following labels:

a) Green Container for Organic Waste;
b) Blue Container for Recyclable (paper, wood, plastic etc.);
c) Yellow Container for Universal Wastes;
d) Electronic items to be segregated under E-waste label (small appliances and electronic goods) and kept at designated area.
e) Sellable scrap materials such as metal, wood etc. to be marked and stored at designated site;
f) Hazardous Substances should be marked and stored separately as prescribed in next sub section.

By effectively segregating waste types on site, BUs can:

a) Avoid contaminating "clean" waste with contaminated or hazardous materials
b) Minimize the quantities (and hence cost) of waste requiring specialized disposal
c) Ensure that the waste disposal option is suited to the waste type
d) Minimize the potential for safety incident or environmental damage at the waste disposal site
e) A uniformity of segregation can be achieved across KE
f) Have more scope for developing on-site management systems

9.4.3. WASTE PACKING & LABELING

Non-Hazardous Waste

Non-Hazardous wastes should be packed (where necessary) and labelled according to the waste category.

Hazardous Waste

For hazardous substance, container shall be of such size, material and design as to ensure that:

a) It can be safely stored, transported and used without leakage;
b) The hazardous substance therein does not deteriorate in a manner as to render it more likely to cause, directly or in combination with other substances, an adverse environmental effect.

Following information shall be printed conspicuously, legibly and indelibly on every container:
a) Name of the hazardous substance;
b) Name, address and license number of the licensee;
c) Net contents (volume or weight);
d) Date of manufacture and date of expiry, if any;
e) A warning statement comprising:
   i. The word "DANGER!" in red on a contrasting background;
   ii. A picture of skull and crossbones;
   iii. Pertinent instructions for use, storage and handling and safety precautions relating thereto.
f) Labelling would be done on both if a hazardous substance has an inner container as well as an outer container;
g) Basic instructions mentioning immediate steps to be taken in case of any accident or emergency, preferably in local language must be attached.

9.4.4. WASTE HANDLING, STORAGE AND TRANSPORTATION

All BUs must follow the outlines of handling and storage of waste at their respective sites and define a time period to retain waste depending upon the nature, quantity and frequency of generation of waste as per records.

9.4.4.1. WASTE HANDLING

Non-Hazardous Waste

Different types of waste demand different types of handling. The general waste containers containing non-hazardous waste should be handled with care to avoid accidents, value loss of resalable items and mishandling.

Hazardous Waste

Special precautions must be taken when handling hazardous waste. Only authorized and trained staff with appropriate PPEs (as per relevant MSDS) should be allowed to handle the wastes. A list of hazardous waste must be present beforehand with the relevant staff and the knowledge of handling of each must be known. MSDS must be displayed at hazardous substance storage areas and handling of each must be carried accordingly. Clinical Waste is also a type of hazardous waste and must be handled with care without coming in direct contact with such waste contents.

9.4.4.2. TEMPORARY STORAGE

a) All scrap/waste that is pending collection by IM/third party contractors must be stored in a safe and secure manner with proper labelling on each waste.
b) Mixing of waste must be avoided at all costs. Waste segregation must be strictly followed such that recyclable waste (i.e. paper, plastic, empty glass bottles, tins, metals scrap etc.) from other waste are stored separately.
c) All waste should be stored in a manner that prevents spillage or scattering of waste.
d) Wherever possible, access to waste containers will be restricted to the designated employees, certified third party waste contractors.
e) Ensure that only appropriate general solid wastes are added to the solid waste container. Certain wastes such as hazardous wastes, appliances, fluorescent lamps, pesticides, liquid waste etc. may not be disposed of in solid waste containers.
f) Where possible, boxes and other containers should be flattened to save space inside containers.

g) All waste containers and bins should have lids, and these should always be kept closed in order to minimize odor and prevent wastes being blown out.
h) The containers should be watertight, with the use of lids being essential during periods of rainfall.
i) Lubricant waste can be recycled, therefore care should be taken for its storage and handling, so that it does not get contaminated or mix with water or other materials e.g. paper, cardboard etc. Filled barrels should be stored with lid closed. Lubricants should be stored separately according to its type/ specification.
j) The premises in which a hazardous substance is generated, collected, consigned, treated, disposed of, stored or handled shall comply with the conditions specified in Schedule-IV of Hazardous Substances Rules, 2014.

9.4.4.3. SECONDARY CONTAINMENT

a) All waste receptacles containing hazardous liquid waste materials shall be stored in a suitable spill containment facility.
b) Where possible, secondary containment should have a capacity of 1.1 times of the original stored material. Receptacles should be stored undercover to prevent the ingress of storm water and the deterioration of the waste receptacle.

9.4.4.4. TRANSPORT

Non-Hazardous Waste

In most cases, transport for disposal of non-hazardous biodegradable waste will be to a designated composting or municipal facility and the non-biodegradable waste that has re-saleable value will go for recycling. It is important to segregate each type of waste at BU, so the value of recyclables is not compromised.

Hazardous Waste

Transportation of hazardous substance shall be carried out as per the requirements of respective provincial EPA Hazardous Substance Rules, and the Contractor's permit shall have the following details:

a) Name and address of the person from whom the hazardous substance is to be collected
b) Name and address of the person to whom the hazardous substance is to be delivered
c) Quantity of hazardous substance to be transported
d) Mode of transport, including full particulars and specifications of the motor vehicles or other conveyance
e) Route to be adopted between the origin and destination
f) Location and method of disposal to be defined
g) Date and time of proposed transportation
h) Marking and signs as per MSDS

9.5. WASTE DISPOSAL

Non-Hazardous Waste

In case of non-hazardous waste, where source reduction, reuse and recycling/recovery options have been fully explored and cannot be implemented feasibly, disposal is to be sought out as the last resort. Disposal of waste should be carried out at proper municipal facility and the destination of waste disposal must be recorded.

Hazardous Waste

Hazardous wastes cannot be discharged into the environment in an effort to "save money," as a matter of "convenience," or due to carelessness in planning, preparation, operations or design. Disposal of hazardous waste substances must be carried out through SEPA certified contractors and as per the best practices of disposal for each hazardous substance (reference can be made to CHSEQ specific procedures).

9.6. SAFETY PRECAUTIONS FOR HAZARDOUS WASTES

The procedure for hazardous substances management (KE-SP-017) is to be followed for the handling and storage of hazardous waste. Only trained staff should be responsible of handling hazardous waste. Safety precautions must be taken for handling and storage of hazardous waste including use of appropriate PPEs. Refer to MSDS for special PPE requirement to minimize the risk of handling hazardous contaminated material.

9.7. TRAINING

All employees must receive awareness training. Training contents must include:

a) Descriptions of all solid waste streams.
b) General techniques for waste management.
c) Disposal Techniques
d) Developing Waste Management Plan
e) Complying with Legal and other requirements

Employees whose work involves solid waste handling, such as maintenance and custodial staff, will also be trained on safe handling, storage and disposal techniques.

9.8. DOCUMENTATION AND RECORD KEEPING

a) The quantity of waste generated must be recorded on KE-SP-012-F02.
b) Record of pictorial and documented evidence of hazardous waste disposal must be maintained with date and time marked.
c) A copy of EPA certified contractor's certificate must be obtained, and hazardous waste disposal documentation must be retained for a minimum of three (03) years.

9.9. EMERGENCY RESPONSE PLAN

All emergencies during handling, storage, and transportation shall be followed as per the BU specific emergency response plan/procedure and respective MSDS.

10. FORMS/DOCUMENTS

a) KE-SP-012-F01: Material/Waste Characterization Summary Sheet
b) KE-SP-012-F02: Waste Inventory Record Form.

KE-SP-012-F01: Material/Waste Characterization Summary Sheet

1. Fiber 1. Corrugated Cardboard 2. Office Paper 3. Miscellaneous Paper 4. Other Mixed/Composite Paper	**5. Glass** 1. Glass Bottles 2. Containers 3. Composite Glass
2. Organic 1. Food 2. Boxboard/ Soiled Paper 3. Manures 4. Cooking Oil/Grease 5. Leaf and Yard Waste 6. Composite Organic	**6. Construction and Demolition** 1. Concrete /Asphalt 2. Lumber 3. Gypsum Board 4. Rocks and Soils 5. Remainder/Composite
3. Plastic: Containers, Bags and Products 1. Polyethylene terephthalate 2. High-density polyethylene 3. Polyvinyl chloride 4. Low-density polyethylene 5. Polypropylene 6. Polystyrene 7. Any combination of plastics 1 through 6.	**7. Hazardous (refer KE-SP-017)** Class 1 - Explosives Class 2 - Gases Class 3 - Flammable and combustible liquids Class 4 - Flammable solids Class 5 - Oxidizing substances; organic peroxides Class 6 - Poisonous (toxic) and infectious Class 7 - Radioactive Materials Class 8 - Corrosives Class 9 - Miscellaneous products, substances
4. Metal 1. Iron/Steel 2. Tin/Steel / Aluminum Cans 3. Aluminum 4. Copper 5. Other Non-Ferrous 6. Remainder/Composite Metal	**8. Universal Waste** 1. Fluorescent Bulbs/Lamps 2. Paint 3. Vehicle and Equipment Fluids 4. Batteries (all types) 5. Household Hazardous Wastes 6. Small Appliances 7. Regulated Electronic Goods
9. Composite & Miscellaneous Materials 1. Textiles (such as clothing and blankets) 2. Bulky Appliances & non-regulated Electronic Dev 3. Bulky Furniture 4. Special Care Waste (Bio-medical)	5. Disposable Cups 6. Composite Packaging 7. Soiled plastic wrap and foil 8. Wood from old furniture or pallets etc. 9. End-of-Life Products

KE-SP-022-F02 **Waste Inventory Record Form**

☐Recurring Materials ☐Unused Materials ☐Unknown Material ☐Any Other (Please specify)

Waste Category	Waste State	Waste Material	Waste Quantity	Source of Generation	Storage Location	MSDS Available	Disposal Frequency	Disposal Through	Disposal Location	Disposal Date	Disposal Evidence	Remarks
H/NH	S/L/G		#/kg / m^3			Y/N	D/M/B/A	IM/Direct			Y/N (Attach)	

LOCATION: ---------- **DATE:** ----------

HSE COORDINATOR: ---------- **DEPARTMENT/BU:** ----------